

REMARKS

INTRODUCTION

In accordance with the foregoing, claims 1, 5, 8 and 12 have been amended. Claims 4, 6, 11 and 13 have been cancelled. Claims 1, 2, 5, 8, 9 and 12 are pending and under consideration.

CLAIM REJECTIONS

Claims 1, 2, 4-6, 8, 9 and 11-13 were rejected under 35 USC 103(a) as being unpatentable over the Applicant's Admitted Prior Art (hereinafter "AAPA") in view of Omura et al. (US 6,559,894) (hereinafter "Omura") and further in view of Fimoff et al. (US 7,035,353) (hereinafter "Fimoff").

Fimoff discusses a channel estimation method blending correlation and least-squares based approaches. In the background section of Fimoff, it is discussed that Figure 4 of Fimoff shows a correlation channel estimator 40 that can be used for the channel estimator 14 to estimate the channel in order to initialize the equalizer 12. The correlation channel estimator 40 includes a cross-correlator 42 that cross-correlates the received signal with the training sequence stored in a memory 44 and a level thresholder 46 that sets to zero any correlation coefficients that are below a predetermined threshold. Accordingly, the correlation channel estimator 40 produces a channel estimate \hat{h} . Fimoff, 6:39-6:48 and Figure 4.

Claims 1, 2, 4 and 5

Amended claim 1 recites: "...said error calculation unit calculates the equalization error using an input signal to said decision unit and an output signal from said decision unit." Support for this amendment may be found in at least original claim 4. The Office Action relies on paragraph [0007] of the present application to show this feature of claim 1. However, it is respectfully submitted that paragraph [0007] of the present application discusses conventional art (referring to Figure 2 of the present application) where the equalization error is calculated by using an output signal from the filter 42 and a signal of a predetermined level outputted from the decision unit 46 through the filter 42. By contrast, claim 1 recites that the error calculation unit calculates the equalization error using an input signal to the decision unit and an output signal from the decision unit. This technical feature of claim 1 provides that the coefficients of the filter are updated by using the equalization error calculated in each operation mode so that

consequently, the coefficients of the filters are updated by using the equalization error so that they converge to perfection and further enables the coefficients of the filters to converge in a short period of time.

Amended claim 1 also recites: "...an estimation decision unit deciding the channel estimation values by applying an adaptive threshold value or a fixed threshold value to the cumulated correlation values..." Support for this amendment may be found in at least paragraph [0061] of the specification. The Office Action relies on Fimoff to discuss this feature of claim 1. Referring to Figure 4 of Fimoff, and the accompanying text at 6:39-6:48, the correlation channel estimator 40 estimates the channel in order to initialize the equalizer 12. The correlation channel estimator 40 includes the cross-correlator 42 that cross-correlates the received signal with the training sequence stored in a memory 44 and the level thresholder 46 that sets to zero any correlation coefficients that are below a predetermined threshold. However, the estimation decision unit recited in claim 1 (for exemplary purposes only, refer to Figure 6, reference numeral 413 of the present application) removes unnecessary noise by applying an adaptive threshold algorithm or a fixed threshold algorithm to the cumulated correlation values. As a result, a delay profile of the received signal, that is, the channel estimation value, is then obtained. These channel estimation values are input to the filter, and the equalization error is calculated in response to the operation mode, and the filter coefficient is updated corresponding to the calculated equalization error. Accordingly, the convergence speed of coefficients of filters can be reduced.

Claim 4 has been cancelled. Claims 2 and 5 depend on claim 1 and are therefore believed to be allowable for at least the foregoing reasons.

Withdrawal of the foregoing rejection is requested.

Claim 6

Claim 6 has been cancelled.

Claims 8, 9, 11 and 12

Amended claim 8 recites: "...said error calculation unit calculates an equalization error using the input signal to said decision unit and the output signal of the predetermined level from said decision unit." Support for this amendment may be found in at least original claim 11. The Office Action relies on paragraph [0010] of the AAPA to show this technical feature of claim 8.

However, it is respectfully submitted that paragraphs [0010] and [0011] of the AAPA only discuss (referring to Figure 3 of AAPA) that the second adder 47 calculates the equalization error by adding output signals from the first adder 44 and the decision unit 46. By contrast, claim 8 recites that the equalization error is calculated using the input signal to the decision unit and the output signal of the predetermined level from the decision unit.

Amended claim 8 also recites: "...an estimation decision unit deciding the channel estimation value by applying an adaptive threshold value or a fixed threshold value to the cumulated correlation values ...". Support for this amendment may be found in at least paragraph [0061] of the specification. The Office Action relies on Fimoff to discuss this feature of claim 8. Referring to Figure 4 of Fimoff, and the accompanying text at 6:39-6:48, the correlation channel estimator 40 estimates the channel in order to initialize the equalizer 12. The correlation channel estimator 40 includes the cross-correlator 42 that cross-correlates the received signal with the training sequence stored in a memory 44 and the level thresholder 46 that sets to zero any correlation coefficients that are below a predetermined threshold. However, the estimation decision unit recited in claim 1 (for exemplary purposes only, refer to Figure 6, reference numeral 413 of the present application) removes unnecessary noise by applying an adaptive threshold algorithm or a fixed threshold algorithm to the cumulated correlation values. As a result, a delay profile of the received signal, that is, the channel estimation value, is then obtained. These channel estimation values are input to the filter, and the equalization error is calculated in response to the operation mode, and the filter coefficient is updated corresponding to the calculated equalization error. Accordingly, the convergence speed of coefficients of filters can be reduced.

Claim 11 has been cancelled. Claims 9 and 12 depend on claim 8 and are therefore believed to be allowable for at least the foregoing reasons.

Withdrawal of the foregoing rejections is requested.

Claim 13

Claim 13 has been cancelled.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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